

Him who is the truth Himself. Let us have confidence in the supremacy of truth. Such has hitherto been the guiding lamp of the Johns Hopkins University. May it ever be the beacon of the future."

SCIENTIFIC SERIALS

A LARGE space in the June number of the *Journal of Botany* is occupied by a long biographical notice, by the editor, of the late Rev. W. W. Newbould, of whom an excellent portrait is also provided. The other articles are almost entirely of local interest.

THE *Journal of the Franklin Institute*, vol. cxxi. No. 724, April 1886.—Lieut. J. P. Finley, tornado study: a useful summary of the principal facts scientifically known respecting tornadoes.—F. E. Galloupe, rapid transit and elevated railroads. This concludes the discussion on this topic.—G. E. Waring, Jun., mechanical appliances in town sewerage; discusses the systems employed in several American cities.—Prof. R. H. Thurston, construction of a large Prony brake. Gives an account of a brake capable of absorbing 540 horse-power.—Dr. W. H. Wahl, summary of engineering and industrial progress for 1885.—Report of Committee on Delany system of multiplex telegraphy.

No. 725, May.—J. M. Hartman, the blast-furnace: a very concise summary of present methods of construction and theories.—Lieut. A. B. Wyckoff, hydrographic work of the U.S. Navy. J. Shinn, the cultivation of flax in the United States.—L. D'Auria, the law of cylinder condensation of steam-engines. The new formulæ indicate that the proper way to decrease cylinder condensation is to increase piston speed.—C. J. Kintner, history of the electrical art in the U.S. Patent Office. An interesting account, in which two early forms of storage battery are described. The author, however, appears to think that nothing can be called an invention unless it has been patented in the United States. There were secondary batteries prior to Kintner's, electric motors prior to Davenport's, and telephones prior to Graham Bell's.—Report of examiners of electrical exhibition on applications of electricity to art productions.

No. 726, June.—Chief Engineer Isherwood, an account of experiments made by Chief Engineers Zeller and Hunt to ascertain the economic effect of using in a non-condensing engine saturated steam alone, and of using it mixed with compressed hot air. No economic saving was effected by this process, as there was not sufficient time for the steam and hot air, which were delivered into the cylinder in separate masses, to become mixed, and the air failed to prevent condensation.—S. L. W., on the Oram system of marine propulsion. This system has twin screws placed forward at about 1/5 of the vessel's length from the bow, in recesses in the sides.—G. W. Chance, the South Street Bridge.—W. Lewis, experiments on the transmission of power by gearing. Valuable researches on the causes of loss of power in worm-gearing and spur-gearing.

No. 727, July.—C. Sellers, Jun., Oliver Evans and his inventions. A biographical notice of this remarkable man, whose prediction of the future of the steam-engine is well known.—O. E. Michaelis, the applications of electricity to marksmanship. This is the first part of the paper, and treats rather of mechanical methods of measuring speed of projectiles, such as Robins's ballistic method.—H. M. Dubois, tests of vehicle wheels.—F. E. Ives, colour-sensitive photographic plates. A compound sensibilisator of fresh blue myrtle chlorophyll with a little eosin is found to be the most sensitive to yellow and green.—Report of Committee on the Phelps induction telegraph. The Committee praise highly this invention for telegraphing to and from a moving train.—Report of Committee on the process and furnace for the reduction of refractory ores and the production of metals, alloys, and compounds, invented by E. H. and A. H. Cowles. Cowles's electric furnace, for reducing ore by means of the voltaic arc between carbon poles, is merely a development of the electric furnace devised by the late Sir W. Siemens. It appears to be eminently suitable for the production of aluminium compounds.—Prof. E. J. Houston, some additional facts concerning the Reis articulating telephone. Gives an account of some recent experiments transmitting speech with the identical apparatus manufactured by Reis and used by him in his lecture before the Physical Society at Frankfort in 1861.

Annalen der Physik und Chemie, vol. xxviii. No. 5, May.—R. Colley, on some new methods for observing electric oscillations, and some applications of them. This paper gives certain relations between the time of oscillation of discharges through a shunt having a great coefficient of self-induction and the capacity of the condenser. Using a standard coil the coefficient of self-induction of which could be determined by its geometrical form, and a normal guard-ring condenser made of three sheets of silvered glass, the capacity of which could equally be determined, the author made experiments from which he deduces a new value of the ratio ϵ , which he gives as 3.015×10^{10} centims. per second.—Hans Jahn, on the relation of the chemical energy and the current energy of galvanic elements. A discussion of Helmholtz's expression for the secondary heat, together with some determinations made on Daniell's and De La Rue's cells.—E. Riecke, on the pyro-electricity of tourmaline. The first part of this paper summarises the previous researches of Gauguin and others upon the electricity of the tourmaline in relation to its section, length, rate of cooling, &c., and gives an account of some new and careful observations made upon three tourmalines. The second part of the paper is devoted to the development of a mathematical theory of the electricity of the tourmaline, based on the physical hypotheses that the molecules possess an initial electric polarisation, measurable in terms of the electric moment per unit of volume, and dependent upon the temperature, and that there is a surface-conductivity of a certain value. The formulæ appear to agree very well with the observed facts.—T. Ihmori, on the absorption of mercury vapour by spongy platinum. A quantity of platinum, deposited from chloride by formic acid, was found to increase in weight in presence of mercury. The author uses this increase of weight to investigate the figures given by Hertz and by Hagen, for the pressure of mercury vapour at different temperatures. His results are considerably lower than those of Hagen, and a little higher than those of Hertz.—C. Pulfrich, on the elastic reaction of a caoutchouc tube.—A. König, on a new method of determining the modulus of elasticity. Errors of observation are avoided by using two mirrors, the inclination of which altered by the loading of the bar under examination.—Karl Exner, on sense-formulæ: lenticular action of non-homogeneous bodies. Discussion of lenticular action of cylindrical disks with parallel plane faces made of materials which, on being cast in moulds, cool non-homogeneously with refractive indices that increase or diminish from point to point below the surface. The formulæ deduced coincide with ordinary lens formulæ when the variation of refractive index is proportional to the square of the depth from the surface. This appears to be nearly the case in disks of cast glue.—W. Wien, researches on the absorption-phenomena occurring in the diffraction of light. This paper discusses diffraction in relation to the colours of metallic reflection. Incidentally it brings out an additional proof that the vibrations are perpendicular to the so-called plane of polarisation.—H. W. Vogel, on some colour-experiments, and on photography in natural colours. Two solutions, one of chrysianilin, the other of anilin blue, in alcohol, are respectively yellow and blue; but when superposed give red, not green. The violet of the spectrum appears to play a very unimportant part in colour-sensations; methyl-violet, and nearly all the so-called violet pigments and dyes owe their tint to mixtures of red and blue rays, not to rays of spectrum violet. For colour-printing at least six tints are found requisite, and in general sufficient. Hence the author thinks that all requirements of colour-photography would be met by six printings from six blocks produced by photography from plates of bromide emulsion, to which the following six substances have been used as "sensibilisators": red, naphthol blue; orange, cyanin; yellow, eosin; green, safranin; green-blue, fluorescein; blue, chrysianilin or aurantin. The author further points out that as the actual tint of any colouring-matter is the complementary colour to that absorbed by the colouring-matter itself, it follows that each of the six plates ought to be printed off in the same dye-stuff that has served as photographic "sensibilisator."—P. Volkmann, note on Prof. Quincke's remarks on the determination of capillary constants of liquids.—R. Schultze, on a small improvement in Wiedemann's pyknometer.

No. 6, June.—A. Kundt and E. Blasius, remarks on some researches on the pyro-electricity of crystals. A convenient apparatus for heating crystals is described; also some observations on the amethyst. The effects of cracks in the crystals are also studied.—K. Mack, pyro-electric and optical observations

on Brazilian topaz. The author refers the phenomena to the presence of a single electric axis, inclined to each of the three principal axes of the crystal. He also points out that the two optic axes do not make equal angles with the greatest of the three principal axes.—W. Stscheglaieff, on the electro-magnetic rotation of the plane of polarisation in chloride of iron. Curves given show that in this substance Verdet's rule that the rotation is proportional to the intensity of the field is not observed.—H. Haga, experimental researches on the convection of heat by the electric current. Careful experiments described in this paper show that the Thomson effect in mercury is negative.—Fr. Stenger, on phenomena of fluorescence. Some doubt having been thrown upon the transmutation, by Magdala red and other bodies, of red rays into orange or yellow rays, the appearance of these higher rays being attributed to stray light, the whole matter has been repeated with the utmost precautions. It appears to be now established that eosin and fluorescein also have this property. All three bodies are exceptions to Stokes's rule that the transmutation in fluorescence is always a degradation in the spectrum scale. The author also discusses the matter in relation to Lommel's theory and to the influence of solvents.—E. Ketteler, a remarkable limiting case of crystalline reflection, and its investigation by the aid of the perfected total-reflectometer of Kohlrausch.—G. Hansemann, on a new method of determination of periods of oscillation of bar-magnets. A photographic camera and a mirror oscillating in conjunction with a seconds pendulum are applied to the ordinary apparatus for observing oscillations by reflection.—Werner Siemens, on the conservation of energy in the atmosphere of the earth. A discussion of atmospheric laws and of *vis viva* of the atmospheric masses, too involved for a brief abstract.—R. Gerhardt, on the tube-flute stop of the organ. An experimental and mathematical discussion of the effect of putting a small open tube into the closed top of the flute pipe.—W. Alexejew, on solutions. The author arrives at the following conclusions: solids dissolve better than liquids; at one given temperature a solid can give only one saturated solution, a liquid two; supersaturated solutions have two temperatures of decomposition, one at which decomposition may occur, another at which decomposition must occur. A large number of data of observation are plotted in curves.—E. Himstedt, reply to the observations of Lord Rayleigh upon my determination of the ohm.—L. Graetz, on the dependence of the elasticity of caoutchouc upon temperature, and its relation to coefficients of thermal expansion. From his observations the author predicts that a twisted rod of caoutchouc, when suddenly further twisted, will warm itself.—Fr. Stenger, simple demonstration of residual electric charges, by means of an exhausted tube used as a Leyden jar.—A. Oberbeck, remarks on my work on the resonance of electric oscillations. An acknowledgment of the priority of Dr. J. Hopkinson.—A. König, on an observation respecting the empirical basis of our perception of space. This basis is the apparent extent of the objects in the field of vision as distributed over the retina, and their relative apparent displacement when the eye is turned about.—Fr. Stenger, correction to the memoir on the properties of calc-spar in a homogeneous magnetic field.

Rivista Scientifico-Industriale, June 30.—On some new registering thermic instruments, by Prof. Filippo Artimini. A full description, with illustrations, is given of the author's registering thermo-pyrometer, in which the degrees of temperature are accurately recorded by an ingenious application of electricity.—Telephoning at great distances, by F. van Rysselberghe. The author gives a summary of his recent experiments in the United States, showing the possibility of telephoning at any distance and establishing a regular international telephonic service between all the great cities of the world. The telegraphic wires now in use may be utilised for the simultaneous transmission of telegraphic and telephonic messages.

SOCIETIES AND ACADEMIES

SYDNEY

Royal Society of New South Wales, June 2.—Chr. Rolleston, C.M.G., President, in the chair.—Papers read:—A new species of *Ardisia* from New Guinea, by Baron Ferd. von Mueller, K.C.M.G., F.R.S., descriptive of the only specimen as yet found so far north.—A comparison of the dialects of East and West Polynesia, Malay, Malagasy, and Australian, by the Rev. George Pratt, author of a dictionary of the Samoan lan-

guage. This was a valuable contribution towards a polyglot of the languages of Polynesia, some of which have already passed away, and most of which are changing through the introduction of new words and the rapid intermingling of various races. The Royal Society of New South Wales was urged to take steps to preserve these records and customs not only of Polynesia, but of the fast-diminishing tribes of Australia.—The discovery of a poison in three species of *Daphnandra*, a genus of plants of the order Monimiaceæ, by T. L. Bancroft, M.B. (Edin.), F.L.S. (Brisbane).—On some new poisonous substances discovered on the Johnstone River, North Queensland, also by Dr. Bancroft. These papers were descriptive of experiments of the therapeutic action on the guinea-pig.—Prof. Liversidge, F.R.S., exhibited and described: (1) a meteorite, the third one known to be found in New South Wales, composed of iron principally, nickel, cobalt, sulphur, phosphorus, and carbon; (2) the matrix of the rock of the tin deposits of Tasmania, in which the cementing material is topaz; (3) a collection of New South Wales silver ores (38 specimens), collected by Mr. McGarvie Smith; (4) shale from the Hawkesbury sandstone showing worm tracks and perforations, the first time noticed in these rocks.—Mr. Lawrence Hargrave exhibited a model illustrating the undulatory motion of serpents, based upon the trichoidal plane, a continuation of similar studies by him on the motion of fishes and the flight of birds.

Microscopical Section.—The following papers were read during the year 1885:—The *Phylloxera vastatrix*, by Dr. Morris, illustrated with specimens of the diseased vine from the neighbourhood of Sydney; and by the same author, Notes on mounting diatoms in highly refractive media.—Specimens of *A. pellucida* were exhibited mounted in piperine, picric acid, chlorides of tin, and thallium, and sulphur in combination with disulphide of arsenic. These slides were exhaustively tested against the American methods, viz. Dr. Chase's metallic silver and realgar, also Prof. Smith's (Geneva, N.Y.) specimen slide. The microscopes and accessories were of the latest make, and the objectives used were homogeneous immersions by Tolles, 1/10, 1/25; Spencer, 1/12; Powell, 1/12, 1/20. The slides of Dr. Morris's sulphur and arsenic combination gave the best results. In addition to the above-mentioned objectives the following choice glasses were acquired by members of the section during the year:—Powell's, 1/6; Hom N.A., 1/5; Green (late Tolles), 1/2" 30°; Bausch and Lomb's, 1/16 immersion; Wales, 1/12 immersion, 170°. A valuable Ross Zentmeyer binocular stand with apparatus was presented by H. G. Wright, M.R.C.S.E., whilst immersion and high-angled condensers were purchased. Amongst the numerous slides exhibited were some of new mosses found in the neighbourhood of Sydney by Mr. Whitelegge, and a bacillus found by Dr. Morris in the ulcerated intestine of a foal, the cause evidently of a widely spread epidemic prevalent throughout the colony amongst young foals only.

PARIS

Academy of Sciences, August 2.—M. Jurien de la Gravière, President, in the chair.—On the relations of geodesy to geology, by M. H. Faye. In this second communication it is shown that the harmony of the two sciences results in the remarkable law determining the constancy of the mathematical figure of the globe throughout the whole series of geological evolutions, a law which sooner or later will enable us to form a clear idea regarding the thickness of the present crust of the earth. At the same time the problem cannot be completely solved by the resources of geometry alone, and recourse must be had to the other sciences bearing on the subject.—On the displacement of ammonia by other bases, and on its quantitative analysis in the soil, by MM. Berthelot and André. From their further researches the authors conclude that magnesia cannot be safely employed for the quantitative analysis of ammonia in the analysis of the earths and other organic products containing insoluble double ammoniacal salts. Certain derivatives from the aldehydes are in the same position, as are also probably the ammoniacal salts formed by the humic and allied acids.—On the quantitative analysis of ammonia (continued), by M. Th. Schloëssing. Having previously shown (July 26) that by distillation on magnesia all the ammonia may be extracted from the solution of its hydrochlorate, or from that of the ammoniaco-magnesian phosphate, the author completes his demonstration by causing the magnesia to act on the double ammoniacal salts, and especially on the chlorides containing magnesium and zinc.—Observations on the oldest sedimentary groups in the north-west of France (continued), by M. Hébert. A careful study of the whole region.